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NAVY A-SCHOOL ACADEMIC SETBACKS: THEIR COST AND IMPLICATIONS FOR RETENTION AND PERFORMANCE

by

Dana Weiner

June 1991

Thesis Advisor: Linda Gorman

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ABSTRACT

This thesis analyzes the implications of academic setback for retention, performance, and training costs using extracts from the Enlisted Training and Tracking (TRAINTRACK) File, Special Cohort Accession and Continuer (DSCAC) Files, and Navy Enlisted Classification Tracking (NECTRACK) File. The proportion of A-school graduates who were and were not setback was compared for different mental categories and high school diploma status. Academic setbacks were promoted at lower rates than non-setbacks for all mental categories. The implication for training costs are ambiguous because the cost data and the setback data are incompatible.

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I. INTRODUCTION

Initial skill training for enlisted personnel at Navy A-schools must foster professional development and contribute directly to overall mission accomplishment. This task has become more complex in the wake of budgetary cuts and reduced manpower levels. In an effort to maintain the quality of A-school instruction under these conditions, the Navy has been studying all aspects of the A-school environment.

Navy A-schools provide initial rate training to enlisted personnel. The majority of students reporting for A-school instruction do so immediately upon completion of recruit training. Others report from various Navy commands as a result of enlistment guarantees, rating conversions, or recommendations from commanding officers. Selection criteria and length of instruction (pipeline lengths) vary between A-schools (See Appendix A). Successful completion of A-school training is designed to lead to attainment of a general service rating, to satisfy mandatory Training Manual (TRAMAN) requirements for advancement to petty officer third class, and to provide graduates the necessary skill and knowledge required to function effectively in future assignments. [Ref. 1:p. A-6]

Chief of Naval Technical Training (CNTECHTRA) Instruction 1540.39C, Attrition and Setback Policy, Monitoring, and Reporting Procedures, states that:

> Student attritions and setbacks are expensive actions which reduce our capability to provide enough well-trained and highly-motivated sailors to the Fleet. Administrative and management procedures must be carefully designed, judiciously applied, and conscientiously monitored to ensure that each setback or attrite is fully justified. [Ref. 2:p. 1]

A-school setbacks are classified as either non-academic or academic. Non-academic setbacks result when training is interrupted for reasons such as emergency leave or hospitalization. Academic setbacks are given to students who are failing to achieve course learning objectives on schedule, provided that other forms of remediation such as extra study, tutoring, or counseling have been exhausted, and that it is clear that an academic setback is in the best interest of both the student and the Navy. [Ref. 3:p. 1]

The decision to allow a setback is made by an A-school's commanding officer based on the recommendation of an Academic Review Board (ARB). The ARB consists of officer and enlisted instructional and supervisory personnel, classroom and learning center instructors, and education or training specialists. [Ref. 4:p. 7]. The ARB reviews a student's performance and interviews him to assess his chances of completing the training. If the board decides that sufficient ability and motivation for graduation exist, it can recommend that the student be setback (normally not to exceed 25 percent of the total course length) rather than expelled.

Setback rates for each A-school pipeline are monitored at all command levels in order to detect significant changes and to take corrective action if necessary. Setback rate reference points, known as Upper Management Limits (UML), have been established for each A-school by the Chief of Naval Education and Training (CNET). These limits are not desired levels of setback, but rather a means of recognizing significant trends. A 12-month moving average of actual setback rates is compared to the UML, and if actual rates vary from the UML by more than the pre-determined tolerances given in Table 1.1, the UML is reviewed for possible adjustment.

For the purpose of this thesis, student quality is defined by different combinations of two criteria, mental category and educational attainment. Mental category is determined by an individual's score on the Armed Forces Qualification Test

TABLE 1.1: ACADEMIC SETBACK UPPER MANAGEMENT LIMITS (UML)

UML	UML vs. 12 Month Actual Tolerance Limit
1 to 5 percent	±2 percent
6 to 10 percent	±3 percent
11 to 15 percent	±4 percent
16 percent or more	±5 percent

Source: CNTECHTRA Instruction 1540.39C

(AFQT). The AFQT is an "aptitude composite", which consists of the Word Knowledge, Paragraph Comprehension, Arithmetic Reasoning, and Numerical Operations subtests from the Armed Services Vocational Aptitude Battery.

The Navy targets mental category I, II and IIIA individuals in its recruiting effort. However, because the military is an all-volunteer force, it must compete with other employers for recruits. In order to meet recruitment goals, the Navy has to strike a balance between lower education and aptitude standards for basic enlistment, and separate (and often higher) standards for assignment to A-schools. [Ref. 5:p. 118]

Studies have shown that high school graduation, while not necessarily a measure of intellectual capacity or aptitude, is useful in predicting an individual's adaptability to military life; non-high school graduates are nearly twice as likely not to complete their first three years of enlistment. [Ref. 5:p. 25] Educational attainment falls into one of two categories: individuals who received regular high school

TABLE 1.2: MINIMUM APTITUDE STANDARDS FOR ENLISTMENT

Education Level	AFQT Percentile
High school diploma graduate	17
GED recipient	31
Non-high school graduate	38

Source: [Eitelberg, Mark J., Manpower for Military Occupations]

diplomas (HSDG) and those who did not (NONHSDG). The first group includes recipients of General Educational Development (GED) certificates of high school equivalency. The latter group includes non-graduates and recipients of certificates of attendance or completion of occupational programs. The Navy uses educational attainment, weighted combinations of ASVAB subtests ("aptitude composites"), and mental categories in screening recruits for enlistment and assigning them to A-schools. Minimum aptitude standards for enlistment in the Navy are shown in Table 1.2, while "aptitude composite" standards for A-schools examined in this study are contained in Appendix A.

This thesis examines the retention, performance, and training costs associated with Navy A-school graduates who were given academic setbacks during their A-school training. Retention is measured by length of service after A-school training, and performance by rate of advancement in rank. Training costs are analyzed using cost data maintained by the Naval Education and Training Program Management Support Activity (NETPMSA). The study is restricted to individuals from

the following ratings: AE, BT, GSM, IIT, MS, RM, and YN ratings. These ratings have diverse "aptidude composite" selection criteria and were recommended by staff members from the office of the Chief of Naval Technical Training (CNTT) to facilitate a comparison of students with different abilities (measured by quality type). [Ref. 6:p. 2]

Academic setbacks have been used in Navy schools to decrease attrition and enhance student academic progress by giving individuals more time to complete their training. While the additional time required for student setbacks does not guarantee graduation, it does result in increased training costs for the Navy. One question is whether any resulting performance and retention improvements outweigh the costs. Other research questions are whether retention and promotion rates differ for A-school graduates who were academically setback, and what costs associated with A-school training are affected by academic setbacks.

II. LITERATURE REVIEW

In order to analyze the effectiveness or benefit of a policy, one must first determine how that policy's success is to be measured, and then select an evaluation technique that can accurately relate this measurement to the costs required to achieve it. For the policy of academic setback, this means first determining the differences in success between A-school graduates who were setback and those who were not, and then evaluating how much these differences cost the Navy.

A. MEASURING SUCCESS

Research on measuring academic performance and linking this performance to adult achievement has historically concentrated on graduates of civilian institutions. Dr. Robert D. Bretz, Jr. of Cornell University employed meta-analytic techniques to review 50 previously published studies (conducted between 1917 and 1983) on the relationship between college grade point average (GPA) and various measures of adult achievement such as salary, tenure, and job satisfaction. Bretz concluded that no GPA-occupational success relationship existed. [Ref. 7:p. 1] He offered three principal explanations for his findings:

- course content and difficulty vary significantly between schools, as well as within them·
- extracurricular activities, while often contributing to a lower GPA, can spawn desirable attributes such as leadership, motivation, or a strong work ethic
- GPA is too subject- and situation-specific and not a measure of general intelligence [Ref. 7:pp. 19-20].

Bretz's findings agreed with those of Alice M. Nelson of the U.S. Civil Service Commission. In her report, Nelson concluded:

> a simple and direct application of grade point average, class standing, or similar academic achievement measures has little merit in valid and job-related selection systems. [Ref. 8:p. 25]

Citing the importance of demographic and behavioral indicators, as well as the complexity of the academic achievement-job success relationship itself, she stressed that grades should only be viewed as one "clue, requiring support from other clues." [Ref. 8:p. 26]

Although education is related to training, the two are not the same. In a 1985 study on military training, Jesse Orlansky of the Institute for Defense Analyses analyzed the differences between training and education. These differences, summarized in Figure 2.1 related more to policy and management issues than to subject matter, methods of instruction, or the nature of students. [Ref. 9:p. 3]

For measuring A-school performance, the closest proxy to GPA in the Navy is graduation status (including academic setback), while occupational success in the Navy is best measured by retention and performance. Using only these measures can produce biased results because retention and performance are also affected by mental category and educational attainment. However, while not all-inclusive, these measures are accessible and important to the Navy. Other inputs such as evaluation reports have limited accessibility and, like GPA, are too subjective and do not indicate general intelligence.

Martha E. Sheills of the Center for Naval Analysis (CNA) examined the relationship between A-school attrition and Navy attrition by comparing retention and promotion rates for individuals who passed and did not pass A-school training, while allowing for differences in mental category and high school diploma status.

Characteristic	Training	Education
Type of Institution	Military Services/ Industry	Schools/Colleges
Types of Courses	Linked to jobs	Linked to careers
Course Length	Days to years	Semester
School Day	Full day	Partial day
Pay and Allowances	Students reimbursed	Not provided
Costs of Instruction	Institution pays	Students pay
Finding a Job After a Course	Institution assigns graduates to job	No obligation
Benefits:		
Completing a course	Institution and student benefit	Only student benefits
Saving student time	School benefits: job benefits (earlier productivity)	No benefit to school (potential loss if school reimbursed on basis of student-days in residence)
Increasing student achievement at school	No benefit to school except for prestige; job benefits if school achievement transfers	No benefit to school except prestige; student benefits if better job follows

Figure 2.1: Distinctions Between Training and Education
Source: [Orlansky, Jesse, The Cost-Effectiveness of Military Training]

The CNA study concluded that high school graduates in the higher mental categories were more likely to complete technical A-schools and earn promotions, and that regardless of mental category or A-school success, those without high school degrees had higher attrition and lower promotion rates. It also found that a strong connection between academic failure in A-school and Navy attrition could not be supported. [Ref.6:p. 37]

All of the aforementioned studies strongly suggest that demographic and behavioral variables such as educational attainment, mental category, and motivation, have greater impact on retention and promotion outcomes than academic performance, and that A-school performance (including academic setback) is not a valid or reliable predictor of future retention and performance outcomes.

B. THE COST OF SUCCESS

Only after understanding the academic setback-occupational success relationship can the relationship between a-school training costs and academic setback be explored. The information necessary to examine A-school training costs is located in the Naval Education Training Command (NAVEDTRACOM) Recruit/Specialized Skill Cost to Train records. "Cost to train" represents the NAVEDTRACOM costs and Navy military pay and allowances incurred for training during a fiscal year in which both course production data and resource (obligation) data are obtained. It is the actual calculated costs for resources which are directly or indirectly chargeable to NAVEDTRACOM training. [Ref. 10:Encl. 2] Figure 2.2 identifies items included in NAVEDTRACOM cost to train.

For education, the relationship between success and cost has traditionally been examined using either cost-benefit analysis (CBA) or cost-effectiveness analysis (CEA). The use of CBA models by training managers is rare. Among the most

TYPE OF COST	DESCRIPTION
Instructional Costs	Costs of conducting training including pay and allowances for instructional personnel, contract instructors, and training equipment maintenance.
Overhead Costs	Indirect costs of conducting training including supplies, materials, TAD, curriculum development, and ADP.
Direct Student Costs	Pay and allowances of the students in training.
Base Support Costs	Costs of the support provided to the training activity by a NAVEDTRACOM activity such as comptroller, security police, and MWR.
Functional Command Support Costs	The costs for the managerial support provided to the training activity by the functional command.

Figure 2.1: NAVEDTRACOM Cost to Train Items
Source: [Analysis and Costing Division, NETPMSA]

frequent reasons given for not using CBA are the difficulty in quantifying the benefits of training, and the inability to separate training's role from other factors in performance improvement. [Ref. 11:p. 60] The use of CEA models requires the development of comprehensive cost element structures. Such a cost element structure has been developed for military training by Mark Knapp and Jesse Orlansky of the Institute for Defense Analyses. It is a highly detailed breakdown of the functional elements of cost that constitute life-cycle costs of military training programs, courses, and devices. [Ref. 12:pp. 3,8]

Unfortunately, neither of these two evaluative techniques can be used in this thesis. CBA cannot be used because evidence of the influence of academic setback on performance and retention must exist before attempts to quantify it can be undertaken. In order to use CEA or Knapp and Orlansky's cost element structure, data must be accessible, detailed, and cover a sufficient period of time. The majority of accessible A-school cost data are too highly aggregated and inconsistent to be suitable for CEA.

Standardized cost data for A-school training conducted prior to fiscal 1986 are not available. Beginning in fiscal 1990, a change in costing methodology was implemented whereby training costs originate at the course level, rather than being prorated from the department level to the course level. [Ref. 10:p. 1] Therefore, including post-fiscal 1985 cost data in an analysis of academic setbacks which occurred between fiscal 1981 and 1984 is extremely complex.

Even with limited cost data, the relationship between A-school training costs and academic setback can be probed. This is accomplished by identifying cost elements of A-school training which are affected by academic setback, and then exploring the magnitude of this effect by comparing changes in setback rates to changes in training costs for Navy A-schools.

III. METHODOLOGY

The success of A-school graduates is measured by identifying students to be used in the sample, establishing their graduation and academic setback status, and tracking their retention and performance outcomes over the years following A-school graduation. The information required to accomplish these steps are the individual's training performance at A-school, and his subsequent promotion and retention history. This information was obtained by merging (using social security numbers) selected A-school training performance data from the Enlisted Training and Tracking (TRAINTRACK) File, selected promotion and retention data from the Special Cohort Accession and Continuer (DSCAC) Files, and selected biographical data from the Navy Enlisted Classification Tracking (NECTRACK) File. The resulting data set contained information on an individual's A-school training performance, demographics, and promotions, as well as the date he left the service. After the data sets were merged, social security numbers were deleted to ensure compliance with Privacy Act requirements.

TRAINTRACK data, obtained from the Navy Personnel Research and Development Center, document every enlisted person's training history. The TRAINTRACK data set contains records of training conducted at schools that report to the Navy Integrated Resources and Administration System (NITRAS). Navy A-schools submit training reports to NITRAS. [Ref. 13:p. 1] DSCAC data are maintained by the Defense Manpower Data Center. This file is a career-tracking file which follows active duty enlisted personnel from the time they enter the Navy to the time they separate. NECTRACK data are derived from the Enlisted Master File

TABLE 3.1: SELECTED RATING PIPELINES AND CORRESPONDING CDPS FOR FISCAL 1980-1984, Source: [NETPMSA]

Rating	Course Data Processing Codes
AE	6218 6235 6515
BT	6260 6486 6489
GSM	606B 606Y 620P 6543 6544 6545 8562 8563 8564 8565
HT	6106 6119 6120 6339 6547
MS	6125
RM	6144 6350 6352 6380 6381
YN	6057

at the Navy Military Personnel Command and contain demographic information on enlisted personnel.

The first step in building the final data set was to select from TRAINTRACK individuals who received instruction between Fiscal 1981 and 1984 in any course associated with one of seven A-schools. Table 3.1 identifies the seven applicable A-schools and associated courses (CDPs) for their specific training pipelines. This five year window provided for a sufficient time for tracking careers. This step was accomplished using the TRAINTRACK elements CDP and FY to define pipeline and time period constraints, respectively. Figure 3.1 explains which data elements from TRAINTRACK were used.

CNET and CNTECHTRA determine the sequence of courses taken by students going to A-schools upon completion of initial military training. As detailed in Appendix B, all but seven of the 28 courses contained in Table 3.2 have been deactivated (changed, consolidated, or eliminated). Because of the fluid nature of

Element	Description
FY	As-of date fiscal year. A 2-position numeric field indicating the fiscal year an individual was undergoing training.
CDP	Course data processing code. A unique 4-position alphanumeric code that identifies each course at a particular training activity.
SDAT	Start date. The 5-digit Julian date on which the student actually began class.
ADAT	Actual graduation date. The 5-digit Julian date of the individual's actual graduation.
ASET	Academic setbacks. A 2-position number indicating the total number of academic setbacks the student incurred in this particular course (CDP).
SAC	Student action code. A 3-character code indicating the final SAC that occurred for the student prior to transfer or discharge.

Figure 3.1: Essential Elements in TRAINTRACK Data Set
Source: [Nakada, Milczersky, Wolfgang, and Wax, "Enlisted Training Tracking File (TRAINTRACK)"]

TABLE 3.2: AFQT CATEGORIES

AFQT Category	AFQT Percentile Score	Level of Trainability
I	93-99	Well above average
II	65-92	Above average
IIIA	50-64	Average
IIIB	31-49	Average
IV	10-30	Below Average
V	1-9	Well below average

Source: [Eitelberg, Mark J. *Manpower for Military Occupations*]

A-school courses. Fiscal 1980 CDPs were included in defining rating pipelines to ensure all relevant instruction was included in the final data set.

The DSCAC data elements used to track post-graduation retention and promotion status, as well as NECTRACK elements used to identify an individual's mental category and educational attainment, are listed in Figure 3.2. AFQT percentiles were grouped, and these groupings designated mental categories I, II, IIIA, IIIB, IV, or V. These groupings appear in Table 3.2.

Using release 5.18 of the Statistical Analysis System (SAS) software, programs were developed which accomplished the following for each of the seven ratings:

- identified A-school graduates
- grouped A-school graduates by mental category and educational attainment
- differentiated between those graduates who were setback and those who were not

DSCAC	Description
PYGD	Paygrade. A 2-position numeric code that indicates an individual's paygrade.
DCPG	Date of current paygrade. A 4-position numeric field (YYMM).
DLE	Date of latest enlistment (YYMM).
DOS	Date of separation (YYMM).
NECTRACK	**Description**
AFQT	AFQT score. A 2-position number which indicates the score attained on the AFQT by the service member.
CERT	Education certification. A unique 1-position character that indicates the highest educational certificate attained.

Figure 3.2: Essential Elements of DSCAC and NECTRACK Data Sets
Source: [Nakada, Milczersky, Wolfgang, and Wax, "Enlisted Training Tracking File (TRAINTRACK)]

- determined retention status at 30-, 45-, and 60-months of service
- determined promotion status at 30-, 45-, and 60-months of service

Finally, separate retention and promotion rates were calculated for all graduates, graduates who were setback, and graduates who were not setback. These proportions were then tested for statistical significance at the .05 level by using a test for comparing two relative frequencies $\hat{p}_1$ and $\hat{p}_2$ where

$$\hat{z} = \frac{| \hat{p}_1 - \hat{p}_2 |}{\sqrt{\hat{p}(1-\hat{p}) \left[(\frac{1}{n_1} + (\frac{1}{n_2}) \right]}}$$

where n_1 and n_2 are the sample size of each group and z is the standard normal distribution. [Ref. 15:pp. 373, 591-592]

IV. DATA ANALYSIS

A. THE SAMPLE

The sample is comprised of 27,010 individuals who graduated from one of seven A-school training pipelines between Fiscal 1981 and 1984, and who commenced this training within two years of entering the Navy. This criteria limits the sample to new recruits who have completed their basic military training (including any travel or minor delays), and eliminates the inclusion of fleet returnees to A-schools.

The sample breaks down into quality groups shown in Table 4.1 Mental categories I and II were combined in order to get large enough sample sizes, while categories IV and V were excluded under the NONHSDG heading because minimum aptitude standards for enlistment (Table 1.2) resulted in sample sizes that were too small. The distribution of A-school graduates contained in Table 4.1 reflects the Navy's history of recruiting individuals from mental categories I, II, and IIIA. Eighty-seven percent (21,908 HSDGs and 1609 NONHSDGs) of the sample fell under these mental categories.

Table 4.2 shows the distribution of A-school graduates who received academic setbacks (ASBs) by quality type. The aggregate data in the last column show that 7.2 percent of all A-school graduates in the sample experienced academic setback during their training. Holding educational attainment constant, the proportion of setbacks increased for lower mental categories. Holding mental category constant, setback proportions by educational attainment were not statistically different at the .05 level.

TABLE 4.1: DISTRIBUTION AND PERCENTAGE OF A-SCHOOL GRADUATES (FISCAL 1981-1984)

Education	Mental Category	Rating														Total	
		AE		BT		GSM		HT		MS		RM		YN			
HSDG	I / II	142	9.6	15	9.7	50	6.0	3	0.2	5	0.6	54	4.8	4	0.4	403	4.9
	IIIA	142	14.8	106	14.3	27	11.0	7	0.6	11	1.1	114	12.1	7	0.9	414	7.1
	IIIB	119	18.7	215	22.3	13	15.6	10	0.9	75	2.9	211	12.6	12	1.5	655	8.4
	IV / V	34	22.7	130	20.2	3	11.1	3	1.5	36	4.7	98	12.5	1	0.4	306	10.7
	Subtotal	437	13.5	596	15.5	93	7.8	23	0.6	127	2.4	477	10.5	24	0.8	1777	7.2
NONHSDG	I / II	25	12.1	7	7.5	0	0.0	3	2.3	0	0.0	14	12.7	0	0.0	49	6.0
	IIIA	17	12.8	3	2.4	0	0.0	7	4.9	4	1.8	21	19.8	1	1.5	53	6.6
	IIIB	12	20.3	4	4.5	0	0.0	4	4.8	8	3.3	37	28.5	2	5.3	67	10.4
	Subtotal	54	13.6	14	4.6	0	0.0	14	3.9	12	1.9	72	20.8	3	1.5	169	7.5
	Total	491	13.5	610	14.7	93	7.8	37	0.9	139	2.4	549	11.2	27	0.9	1946	7.2

Source: Derived from TRAINTRACK, DSCAC, and NECTRACK Data

TABLE 4.2: DISTRIBUTION AND PERCENTAGE OF A-SCHOOL GRADUATES WITH ACADEMIC SETBACKS (FISCAL 1981-1984)

		Rating															
Education	Mental Category	AE		BT		GSM		HT		MS		RM		YN		Total	
HSDG	I / II	1481	40.8	1497	36.0	831	69.7	1347	32.2	891	15.3	1130	23.1	1038	33.2	8215	30.4
	IIIA	959	26.4	742	17.9	246	20.6	1169	27.9	997	17.1	945	19.3	797	25.4	5855	21.7
	IIIB	638	17.6	965	23.2	82	6.9	1103	26.4	2554	43.7	1680	34.5	816	26.0	7838	29.0
	IV / V	150	4.1	645	15.5	27	2.3	206	4.9	758	13.0	782	16.0	282	9.0	2850	10.6
	Subtotal	3228	88.9	3849	92.6	1186	99.5	3825	91.4	5200	89.1	4537	92.9	2933	93.6	24758	91.7
NONHSDG	I / II	206	5.7	93	2.2	4	0.3	130	3.1	170	2.9	110	2.3	97	3.1	810	3.0
	IIIA	133	3.7	124	3.0	1	0.1	144	3.4	225	3.9	106	2.2	66	2.1	799	3.0
	IIIB	59	1.7	89	2.2	1	0.1	84	2.1	242	4.1	130	2.6	38	1.2	643	2.3
	Subtotal	398	11.1	306	7.4	6	0.5	358	8.6	637	10.9	346	7.1	201	6.4	2252	8.3
	Total	3626	100	4155	100	1192	100	4183	100	5837	100	4883	100	3134	100	27010	100

Source: Derived from TRAINTRACK, DSCAC, and NECTRACK Data

Examining individual ratings, absolute setback percentages were highest among the more technical AE, BT, GSM, and RM ratings. In the less technical HT, MS and YN ratings, the proportion of ASBs among graduates was relatively low. This difference is probably due to the more difficult curricula of the technical A-schools.

These findings support claims that aptitude test results are better than educational attainment as an indicator of trainability and academic success. They also highlight the importance of controlling for these variables in subsequent analyses.

B. RETENTION AND PROMOTION

Having constructed the sample and categorized A-school performance in terms of academic setback, post-graduation success was measured using retention and promotion rates. By reporting the proportion of A-school graduates who completed their initial obligated service or first-term enlistment, retention rates serve as a measure of reenlistment. Reenlistment is a desirable outcome from the Navy's point of view because it keeps experienced personnel in the service and avoids incurring the costs of recruiting and training replacements.

Table 4.3 presents the retention rates for all A-school graduates in the sample, arranged by student quality. Overall retention rates are further broken down by graduates who were setback (ASBs) and graduates who were not setback (NONASBs). Time periods were based on an individual's date of entry into the service. Thirty months was used because it is less than the time required for the initial obligation of service for everyone in the sample. Forty-five months is less than the end of service for those with four-year obligations, while 60 months is greater than the initial enlistment obligation of all individuals in the sample, except for six-year obligators. Only the GSM rating had a high number of six-year obligators and, not surprisingly, had the highest 60-month survival rate.

Due to the low number of total academic setbacks in certain ratings (GSM, HT, and YN), and the low number of NONHSDG ASBs in all ratings, aggregate retention rates were examined. Table 4.3 shows that with the exception of mental category I/II HSDGs, there was no statistically significant difference between overall ASB and NONASB 30-month retention rates. Controlling for mental category, 30-month retention rates for all graduates were significantly lower for NONHSDGs.

Controlling for mental category, 30-month retention rates for all graduates were significantly lower for NONHSDGs. Controlling for educational attainment, ASBs in most mental categories had lower retention rates than NONASBs at 45 and 60 months.

These findings support the claim that non-high school graduates fail to complete their initial service obligations at higher rates than high school graduates. They also suggest that mental category, an indicator of A-school performance (as measured by academic setback), may also indicate higher percentages of ASB losses after the first three years of service.

Promotion, the second measurement of post-graduation success, was analyzed in a similar fashion. Promotion is an important measure because it represents the culmination of numerous accomplishments such as longevity, experience, technical proficiency, and good conduct. In addition to improving an individual's status within the Navy's hierarchy, promotion also provides the individual with monetary incentives in the form of increased pay and allowances.

Table 4.4 shows the percentage of A-school graduates in the sample who advanced to or beyond paygrades E-4 and E-5 by various periods of time. As in the case of retention rates, time periods were based on an individual's date of entry into the service. For each paygrade-time period combination, overall promotion rates are

TABLE 4.3: RETENTION RATES FOR ALL RATINGS (PERCENT)

		Retention Period								
		30 Months			45 Months			60 Months		
Education	Mental Category	All Grads	ASBs	Non-ASBs	All Grads	ASBs	Non-ASBs	All Grads	ASBs	Non-ASBs
HSDG	I / II	82.1	76.9	82.4*	65.8	60.8	66.1*	26.9	20.8	27.2*
	IIIA	81.9	83.1	81.8	64.5	61.4	64.8	21.8	19.8	22.0
	IIIB	80.2	79.4	80.3	62.4	58.9	62.8*	23.0	18.9	23.4*
	IV / V	83.6	82.3	83.7	67.8	66.6	68.0	24.4	10.1	24.9*
	Subtotal	81.6	80.2	81.7	64.7	61.2	65.0	24.1	19.8	24.5
NONHSDG	I / II	63.2	75.5	62.4	43.2	55.1	42.5	15.4	16.3	15.4
	IIIA	60.6	69.8	59.9	41.3	50.9	40.6	13.9	17.0	13.7
	IIIB	66.3	74.6	65.3	44.2	58.2	42.5*	16.0	14.9	16.1
	Subtotal	63.1	8.7	1.2	42.8	9.6	2.1	15.1	8.0	0.5
	Total	80.1	79.6	80.2	62.9	60.7	63.1*	23.4	19.4	23.7*

* Indicates statistical significance at the .05 level

Source: Derived from TRAINTRACK, DSCAC, and NECTRACK Data

broken down by ASBs and NONASBs. Aggregate data are presented in Table 4.4. Promotion rates by individual rating and quality type are given in Appendix D.

For NONASBS, promotion rates for HSDGs were higher than NONHSDGs for E-4 and 45 months, E-5 and 45 months. Promotion to E-4 by 30 months was the exception. ASB promotion rates exhibited the same pattern, with the exception of promotion to E-5 by 45 months. The results also show that among HSDGs in the sample, NONASBs had higher promotion rates than ASBs, regardless of mental category.

These findings clearly show that high school degree status is an indicator of the likelihood for promotion. Since receiving an academic setback in A-school does not figure in the selection process for promotion, these findings also suggest that the variables which contribute to academic setback might also influence the likelihood of promotion.

Summarizing the relationship between academic setback and success, A-school graduates in lower mental categories were more likely to be setback prior to completing their A-school training. Between A-school graduation and 30 months of service, NONHSDGs tended to separate from the Navy at higher rates than HSDGs, regardless of setback status or mental category. After 30 months of service, high school degree status made no significant difference in retention rates, but retention rates for ASBs lagged those of NONASBs, except for category IIIA individuals. Educational attainment and mental category were significant in nearly all promotion rates, and among HSDGs, ASB promotion rates lagged those of NONASBs for every promotion and time period.

TABLE 4.4: PROMOTION RATES FOR ALL RATINGS (PERCENT)

Education	Mental Category	Promotion and Time Period											
		E-4 by 30 Months			E-4 by 45 Months			E-5 by 45 Months			E-5 by 60 Months		
		All Grads	ASBs	Non-ASBs	All Grads	ASBs	Non-ASBs	All Grads	ASBs	Non-ASBs	All Grads	ASBs	Non-ASBs
HSDG	I / II	56.8	44.2	56.4*	64.1	53.1	64.7*	32.8	18.6	33.5*	39.7	24.1	40.5*
	IIIA	51.2	41.1	52.0*	61.1	51.4	61.8*	19.5	9.7	20.3*	25.2	16.9	25.9*
	IIIB	45.3	33.6	46.4*	56.4	46.9	57.2*	11.7	4.9	12.3*	18.5	10.1	19.3*
	IV / V	40.6	34.8	41.3*	53.0	45.9	53.8*	8.1	3.3	8.7*	15.1	9.5	15.8*
	Subtotal	49.7	37.9	50.8	59.7	49.2	63.6	20.1	8.8	21.0	26.7	14.7	27.7
NONHSDG	I / II	29.0	8.9	30.0*	37.5	34.7	37.8	11.4	4.1	11.8	15.6	8.2	16.0
	IIIA	22.4	22.6	22.4	30.8	30.2	30.8	7.1	5.7	7.2	10.0	7.5	10.2
	IIIB	22.8	20.9	22.7	33.3	47.8	31.6*	5.9	4.5	6.1	10.1	9.0	10.2
	Subtotal	24.8	19.5	25.3	33.9	38.5	33.6	8.3	4.7	8.6	12.0	8.3	12.3
	Total	47.6	36.3	48.5*	57.5	48.3	58.3*	19.1	8.5	20.0*	25.5	14.2	26.4*

* Indicates statistical significance at the .05 level for ASBs versus Non-ASBs in each mental category

Source: Derived from TRAINTRACK, DSCAC, and NECTRACK Data

C. A-SCHOOL TRAINING COSTS

The final section of this chapter explores the relationship between A-school training costs and academic setback. As stated earlier, it is desirable for an organization to be able to measure a program or policy, both in terms of success, and the cost of achieving success. Keeping in mind that ASBs appeared to have lower retention rates after 30 months in all mental categories except IIIA and that NONASBs had higher promotion rates than ASBs regardless of mental categories, an interesting question is whether ASBs make an important contribution to higher training costs.

Ideally, an analysis of the training cost-academic setback relationship would examine concurrent cost and setback data for the entire training pipelines of each rating. Unfortunately, one department of NETPMSA keeps track of costs and another keeps track of setbacks. Because the two groups use different courses (CDPs) to define rating pipelines, the data are incompatible for every rating except MS and YN. As a result, "ratings" in this section of the analysis are comprised of only those curriculum courses where both cost data and setback data are available.

A-school training cost data are maintained by the Analysis and Costing Division of NETPMSA. This division uses financial data from the Navy accounting system and student data from NITRAS to generate cost data. The data include full, fixed, and variable costs which reflect the direct and indirect costs of instructors, support personnel, curriculum materials and development, supplies, contracts, and a pro rata share of base operations support costs. The data also include Navy military pay and allowances for instructors, support personnel, and students. [Ref. 13:p. 1] Annual costs per graduate are broken down by rating and course. The data represent are the average costs, not the marginal or opportunity costs associated with A-school training.

TABLE 4.5: AVERAGE ANNUAL INCREASE (DECREASE) FOR COST-SETBACK ITEMS (PERCENT, FISCAL 1986-1990)

	Rating							
	AE	BT	GSM[1]	HT	MS	RM	YN	TOTAL
Fixed Cost per Graduate	2.1	2.1	(0.8)	(9.4)	6.3	(0.1)	1.3	0.2
Variable Cost per Graduate	9.1	19.8	5.1	(3.8)	23.7	9.2	8.2	10.2
Number of Graduates	(16.2)	(16.9)	31.9	2.0	12.3	(2.8)	1.1	2.1
Graduate to Attrite Ratio	(8.3)	(2.0)	32.3	(3.1)	(7.5)	13.1	17.4	6.0
Setback Rate	5.2	(18.1)	5.0[2]	(0.3)	0.8	(1.5)	3.7	(2.2)

[1]Fiscal 1987-1990
[2]Fiscal 1988-1990

Changes in annual costs per graduate were calculated for each rating and compared to changes in setback rates over the same period. Appendix E contains selected cost and setback data by rating for Fiscal 1986-1990. Table 4.5 summarizes these data by showing average annual changes for each item of interest over the five-year period. Once again, it is important to stress that these figures do not represent the entire training pipelines for all ratings.

Table 4.5 shows that fixed cost per graduate remained relatively unchanged during the five-year period, while variable cost per graduate increased by over ten

percent each year. Possible explanations for the cost increases include inflation, changes in accounting and costing methods, new pay and allowance levels, curriculum length and content, and the use of simulators and other training devices. Unfortunately, the available cost data do not allow one to itemize these cost increases. Thus it is impossible to determine what portion, if any, of these cost increases are the result of A-school setback policy.

While not included in the available cost data, opportunity costs and marginal costs warrant discussion. If an individual is setback and eventually graduates, various opportunity costs may be incurred. One such cost is the delay in receiving a trained individual (A-school graduate) by an operational unit. This delay can result in involuntary extensions for individuals awaiting replacement, or a particular job (billet) going unfilled for an extended period of time. Another potential opportunity cost results from restrictions placed on new enrollments imposed because of an influx of ASBs into later classes.

Since the number of ASBs tends to be small and the marginal costs associated with remedial work may be of greater concern. But these marginal costs associated with academic setback are minimal because most of the additional resources required to implement academic setback have already been expended during the exhaustion of remedial efforts. Once a setback has been awarded and a student placed in a later class, no significant real costs are incurred.

Theoretically, an effective setback policy should increase both the number of graduates and the graduate-to-attrite ration and reduce the high costs associated with attrition by identifying and awarding setbacks to individuals who ultimately graduate and recommending attrition early enough in cases where students will not graduate.

Table 4.5 also shows increases in both the total number of graduates and the total graduate-to-attrite ratio over the five-year period. The total setback rate on the other hand decreased of over two percent each year. Increased student enrollment, more selective screening of entrants, less difficult (or more comprehensible) curricula, or the degree of leniency by ARBs and commanding officers could have influenced the larger number of graduates, as well as the improved graduate-to-attrite ratio. Any combination of these scenarios might also have contributed to the lower setback rates.

Graduate-to-attrite ratio was included in Table 1.5 because attrition is much more costly to the Navy than setback. Of course, a student who was setback and subsequently attrited represents the highest cost to the Navy, since both setback costs are incurred and no graduate is produced.

V. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this thesis was to analyze the implications of A-school academic setbacks for retention, performance and training costs. This was accomplished by developing a data set that merged portions of the Enlisted Training and Tracking (TRAINTRACK) File, the Special Cohort Accession and Continuer (DSCAC) Files, and the Navy Enlisted Classification Tracking (NECTRACK) File. In addition, a literature review was undertaken to provide a summary of available information on factors that influence academic performance, the validity of academic performance as an indicator of occupational success, the relationship between A-school and Navy attrition, and various cost evaluation techniques. The data set was analyzed by identifying A-school graduates who were setback, and comparing their retention and promotion rates to graduates who were not setback. Finally, using cost data and setback data provided by the Naval Education and Training Program Management Support Activity (NETPMSA), the types and magnitude of costs associated with academic setback were explored.

A. CONCLUSIONS

The following specific conclusions are drawn from the results of the study:

1. In the aggregate, mental category was a good indicator of academic setback for A-school graduates. However, the number of A-school graduates who were setback represented a small proportion (7.2 percent) of all A-school graduates.

2. The proportion of ASBs who were retained in 30-months was not significantly different than the proportion of non-ASBs. It was significant in 45- and 60-month retention rates for HSDGs in mental categories I/II and IIIB. However, this was not the case for IIIA HSDGs who represent 21.7 percent of all graduates in the sample and are highly sought after by Navy recruiters.

3. Regardless of mental category or time period, promotion rates for HSDGs who were setback were less than promotion rates for those who were not setback. The differences in these promotion rates ranged from 5.4 percent (mental category IV/V, E-5 by 45 months) to 16.4 percent (mental category I/II, E-56 by 60 months).

4. Based on the small proportion of A-school graduates who were setback, and the overall absence of any statistically significant disparity between the retention and promotion of setbacks and non-setbacks, the Academic Review Boards appear to identify people who benefit from academic setbacks.

5. Unfortunately, one department of NETPMSA keeps track of costs and another keeps track of setbacks. Because the two groups use different courses (CDPs) to define rating pipelines, the data are incompatible for every rating except MS and YN.

B. RECOMMENDATIONS

The following recommendations are based upon the results of this thesis:

1. Utilize procedures similar to those in this thesis to expand this analysis to include more ratings, longer time periods, and other demographic characteristics that are highly correlated to ASVAB test scores (i.e., racial/ethnic group and gender).

2. Continue to evaluate prerequisite skill training for Navy A-schools that have high setback rates. Ensure that feedback from Academic Review Boards are included in this evaluation.

3. Evaluate the completeness and usefulness of cost data entered into NETPMSA data bases. Ensure that the courses (CDPs) that are used to define ratings are those promulgated by CNET and are being used consistently by different divisions within NETPMSA.

4. Develop a cost element structure (CES) for Navy A-school training that includes provisions for setback and attrition, and use this CES to guide the type of the cost data collected on A-school training.

APPENDIX A
Rating and A-School Description

RATING SCHOOL	OCCUPATIONAL FIELD	APTITUDE COMPOSITE QUALIFICATIONS[1]	LENGTH (DAYS)[2]
AE - Aviation Electrician's Mate	Aviation Maintenance Weapons	AR + 2MK + GS = 196	152
BT - Boiler Technician	Marine Engineering	MK + AS = 96	92 (4YO) 150 (6YO)
GSM - Gas Turbine Systems Technician Mechanical	Marine Engineering	AR + MK + EI +GS = 204	153 (4YO) 178 (6YO)
HT - Hull Technician	Ship Maintenance	VE + MC + AS = 158	60
MS - Mess Management Specialist	Logistics	VE + AR = 89	47
RM - Radioman	Communications	VE + MK + CS = 147	89
YN - Yeoman	Administration	VE + NO + CS = 160	49

[1] Aptitude Composites are combinations of individual ASVAB subtests. The ten subtests are General Science (GS), Arithmetic Reasoning (AR), Work Knowledge (WK), Paragraph Comprehension (PC), Numerical Operations (NO), Coding Speed (CO), Auto and Shop Information (AS), Math Knowledge (MK), Mechanical Comprehension (MC), and Electronics Information (EI). Verbal Composite (VE) is a combination of the WK and PC subtests.

[2] 4YO - four-year obligator; 6YO - six-year obligator

Source: U.S. Navy Enlisted Transfer Manual

APPENDIX B
Status of A-school CDPs (Fiscal 1980-1984)

RATING	CDP	COURSE TYPE[1]	DEACTIVATION DATE
AE	6218	AP	SEP 1990
	6235	AP	FEB 1987
	6515	A1	ACTIVE
BT	6260	AP	ACTIVE
	6486	A1	ACTIVE
	6489	A1	DEC 1982
GSM	606B	AP	ACTIVE
	606Y	A1	OCT 1983
	610P	A1	APR 1986
	6513	AP	OCT 1980
	6514	AP	OCT 1980
	6515	AP	OCT 1980
	8562	AP	JAN 1981
	8563	A1	OCT 1983
	8564	A1	OCT 1983
	8565	A1	OCT 1983
HT	6106	A1	NOV 1981
	6119	A1	MAY 1987
	6120	A1	ACTIVE
	6339	A1	NOV 1981
	6517	C1	NOV 1981
MS	6125	C1	NOV 1981
RM	6144	A1	SEP 1984
	6350	AP	OCT 1980
	6352	AP	MAY 1984
	6380	A1	SEP 1984
	6381	A1	SEP 1984
YN	6057	A1	ACTIVE

AP - Enlisted Preparatory School
A1 - Enlisted Skill Training, Enlisted
C1 - Skill Progression Training, Enlisted

Source: Office of CNTT, Memphis, Tennessee

APPENDIX C

Retention Rates by Individual Rating

Rating	Education	Mental Category	Retention Period: 30 Months All Grads	30 Months ASBs	30 Months NON-ASBs	45 Months All Grads	45 Months ASBs	45 Months NON-ASBs	60 Months All Grads	60 Months ASBs	60 Months NON-ASBs
AE	HSDG	I / II	87.5	85.2	87.8	71.6	70.4	71.8	17.9	19.7	17.7
		IIIA	87.4	88.0	87.3	69.9	66.9	70.0	21.8	22.5	21.7
		IIIB	87.8	90.8	87.1	66.6	71.4	65.5	23.2	27.7	22.1
		IV / V	91.3	91.2	91.4	73.3	70.6	74.1	20.0	26.5	18.1
		Subtotal	87.7	88.1	87.6	70.1	69.6	70.2	20.2	23.3	19.7
	NONHSDG	I / II	70.4	80.0	69.1	53.4	60.0	52.5	16.0	24.0	14.9
		IIIA	66.9	76.5	65.6	48.9	70.6	45.7	18.0	23.5	17.2
		IIIB	64.4	83.3	59.6	33.9	66.7	25.5	10.2	25.0	6.4
		Subtotal	68.3	79.6	66.6	49.0	64.8	46.5	15.8	24.1	14.5
		Total	85.6	87.2	85.3	67.8	69.0	67.6	19.7	23.4	19.1
BT	HSDG	I / II	77.2	68.3	78.2	59.5	48.3	60.7	38.3	24.1	39.8
		IIIA	76.8	76.4	76.9	53.1	52.8	53.1	22.0	19.8	22.3
		IIIB	77.5	77.7	77.5	51.8	51.6	51.9	13.5	11.6	14.0
		IV / V	82.2	83.1	81.9	61.7	66.2	60.6	16.6	14.6	17.1
		Subtotal	78.0	76.3	78.4	56.7	54.2	57.2	25.3	16.8	26.8
	NONHSDG	I / II	55.9	71.4	54.7	32.3	57.1	30.2	11.8	0.0	12.8
		IIIA	56.5	66.7	56.2	32.3	33.3	32.2	11.3	33.3	10.7
		IIIB	58.4	75.0	57.6	32.6	50.0	31.8	7.9	0.0	8.2
		Subtotal	56.9	71.4	56.2	32.4	50.0	31.5	10.5	7.1	10.6
		Total	76.5	76.2	76.5	54.9	54.1	55.1	24.2	16.7	25.5

			Survival Period								
			30 Months			45 Months			60 Months		
Rating	Education	Mental Category	All Grads	% of ASBs	Delta (Decrease)	All Grads	% of ASBs	Delta (Decrease)	All Grads	% of ASBs	Delta (Decrease)
GSM	HSDG	I / II	83.0	86.0	82.8	71.2	74.0	71.1	44.4	30.0	45.3
		IIIA	87.0	85.2	87.2	77.2	63.0	78.1	37.4	18.5	39.7
		IIIB	86.6	76.9	88.4	79.3	69.2	81.2	42.7	30.8	44.9
		IV / V	88.9	66.7	91.7	77.8	66.7	79.2	48.1	0.0	54.2
		Subtotal	84.2	83.9	84.3	73.2	69.9	73.5	42.9	25.8	44.4
	NONHSDG	I / II	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0	50.0
		IIIA	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
		IIIB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Subtotal	50.0	0.0	50.0	33.0	0.0	33.3	33.0	0.0	33.3
		Total	84.1	83.9	84.1	73.0	69.9	73.2	42.9	25.8	44.3
HT	HSDG	I / II	86.8	66.7	86.8	66.7	66.7	66.7	20.3	0.0	20.3
		IIIA	84.4	71.4	84.5	64.4	28.6	64.6	11.8	0.0	11.9
		IIIB	85.0	70.0	85.2	65.1	30.0	65.4	12.3	0.0	12.4
		IV / V	89.8	66.7	90.1	72.3	66.7	72.4	10.7	66.7	9.9
		Subtotal	85.7	69.6	85.8	65.9	39.1	66.0	14.9	8.7	14.9
	NONHSDG	I / II	68.5	100.0	67.7	44.6	66.7	44.1	7.7	33.3	7.1
		IIIA	67.4	57.1	67.9	50.0	28.6	51.1	11.1	0.0	11.7
		IIIB	71.4	100.0	70.0	53.6	75.0	52.5	15.5	0.0	16.3
		Subtotal	68.7	78.6	68.3	48.9	50.0	48.8	10.9	7.1	11.4
		Total	84.3	73.0	84.4	64.4	43.2	64.6	14.5	8.1	14.6

Rating	Education	Mental Category	Retention Period: 30 Months All Grads	30 Months ASBs	30 Months NON-ASBs	45 Months All Grads	45 Months ASBs	45 Months NON-ASBs	60 Months All Grads	60 Months ASBs	60 Months NON-ASBs
MS	HSDG	I / II	76.2	40.0	76.4	56.1	20.0	56.3	17.1	0.0	17.2
		IIIA	74.7	45.5	75.1	57.7	36.4	57.9	22.6	27.3	22.5
		IIIB	74.4	62.7	74.8	58.5	52.0	58.7	26.9	24.0	26.2
		IV / V	79.8	63.9	80.6	66.8	55.6	67.3	26.1	11.1	26.9
		Subtotal	75.6	60.6	76.0	59.2	50.4	59.4	23.9	19.7	24.4
	NONHSDG	I / II	52.9	0.0	52.9	29.4	0.0	29.4	11.8	0.0	11.8
		IIIA	52.4	75.0	52.0	33.8	50.0	33.5	11.6	0.0	11.8
		IIIB	62.4	50.0	62.8	40.1	50.0	39.7	16.9	0.0	17.5
		Subtotal	56.4	58.3	56.3	35.0	50.0	34.7	13.7	0.0	13.9
		Total	73.5	60.4	73.8	56.5	50.4	56.7	22.8	18.0	22.9
RM	HSDG	I / II	83.9	72.2	84.5	70.7	57.4	71.4	27.3	11.1	28.2
		IIIA	84.1	86.0	83.9	69.7	64.9	70.4	22.9	14.9	23.9
		IIIB	84.5	80.6	85.0	68.6	61.6	69.6	25.7	19.0	26.7
		IV / V	84.1	85.7	83.9	69.5	69.4	69.7	30.4	27.6	30.8
		Subtotal	84.2	82.0	84.5	69.5	63.5	70.2	26.3	18.9	27.2
	NONHSDG	I / II	71.8	64.3	72.9	54.6	42.9	56.3	26.4	7.1	29.2
		IIIA	70.8	71.4	70.6	51.9	47.6	52.9	18.9	19.0	18.8
		IIIB	76.9	73.0	78.5	58.5	54.1	60.2	20.8	13.5	23.7
		Subtotal	73.4	70.8	74.1	55.2	50.0	56.6	22.0	13.9	24.1
		Total	83.4	80.5	83.8	68.5	61.7	69.4	26.0	18.2	27.0

Rating	Education	Mental Category	Retention Period: 30 Months All Grads	30 Months ASBs	30 Months NON-ASBs	45 Months All Grads	45 Months ASBs	45 Months NON-ASBs	60 Months All Grads	60 Months ASBs	60 Months NON-ASBs
YN	HSDG	I / II	77.7	100.0	77.7	64.3	100.0	64.1	25.5	0.0	25.6
		IIIA	80.9	100.0	80.8	67.8	85.7	67.6	29.4	57.1	29.1
		IIIB	79.7	91.7	79.5	66.3	75.0	66.2	31.1	33.3	31.1
		IV / V	86.2	100.0	86.1	72.3	100.0	72.2	30.5	0.0	30.6
		Subtotal	80.0	96.8	79.8	66.6	83.3	66.4	28.6	33.3	28.6
	NONHSDG	I / II	56.7	0.0	56.7	41.2	0.0	41.2	20.6	0.0	20.6
		IIIA	51.5	0.0	52.3	33.2	0.0	33.8	16.7	0.0	16.9
		IIIB	65.8	100.0	63.9	44.7	100.0	41.7	23.7	100.0	19.4
		Subtotal	56.7	66.7	56.6	39.3	66.7	38.9	19.9	66.7	19.2
		Total	78.5	92.6	78.3	64.8	81.5	64.7	28.0	37.0	28.0

APPENDIX D

Promotion Rates by Individual Rating

Rating	Education	Mental Category	Promotion and Time Period: E-4 by 30 Months All Grads	E-4 by 30 Months ASBs	E-4 by 30 Months NON-ASBs	E-4 by 45 Months All Grads	E-4 by 45 Months ASBs	E-4 by 45 Months NON-ASBs	E-5 by 45 Months All Grads	E-5 by 45 Months ASBs	E-5 by 45 Months NON-ASBs	E-5 by 60 Months All Grads	E-5 by 60 Months ASBs	E-5 by 60 Months NON-ASBs
AE	HSDG	I / II	56.0	42.3	57.4	68.1	54.9	69.5	32.1	21.1	33.2	37.1	25.4	38.4
		IIIA	47.5	34.5	49.8	61.8	49.3	64.0	22.0	9.9	24.1	27.9	16.9	29.9
		IIIB	42.6	34.5	44.6	58.2	51.3	59.7	16.0	8.4	17.7	23.7	16.8	25.2
		IV / V	44.0	50.0	42.2	57.3	58.8	56.9	10.0	5.9	11.2	21.3	11.8	24.1
		Subtotal	50.3	38.2	52.2	63.8	52.4	66.2	24.9	12.8	26.8	31.0	19.2	32.9
	NONHSDG	I / II	34.5	16.0	37.0	43.2	36.0	44.2	16.5	4.0	18.2	20.4	12.0	21.5
		IIIA	27.1	23.5	27.6	34.6	47.1	32.8	10.5	5.9	11.2	15.8	11.8	16.4
		IIIB	22.0	33.3	19.1	27.1	50.0	21.3	6.8	16.7	4.3	7.4	16.7	6.4
		Subtotal	30.2	22.2	31.4	37.9	42.6	43.8	13.1	7.4	14.0	17.1	13.0	17.7
		Total	48.1	36.5	49.9	60.9	51.3	55.2	23.6	12.2	25.4	29.5	18.5	31.2
BT	HSDG	I / II	61.5	48.3	62.9	68.5	52.4	70.3	29.7	19.3	30.8	38.0	24.1	39.5
		IIIA	42.9	41.5	43.1	53.0	47.2	53.9	14.7	6.6	16.0	20.2	17.9	20.6
		IIIB	28.1	34.4	26.3	41.9	45.1	40.9	5.2	2.8	5.9	10.6	7.0	11.6
		IV / V	26.0	33.1	24.3	42.2	43.8	41.7	4.0	3.8	4.1	9.8	8.5	10.1
		Subtotal	43.6	38.8	44.5	54.4	47.0	55.8	16.3	7.7	17.9	23.0	13.4	24.7
	NONHSDG	I / II	18.2	14.3	18.6	30.1	57.1	27.9	4.3	0.0	4.7	11.8	0.0	12.8
		IIIA	16.1	33.3	15.7	23.4	33.3	23.1	4.0	0.0	4.1	6.5	0.0	6.6
		IIIB	9.0	25.0	8.2	21.3	75.0	18.8	2.2	0.0	2.4	3.4	0.0	3.5
		Subtotal	14.7	21.4	14.4	24.8	57.1	23.3	3.6	0.0	3.8	7.2	0.0	7.5
		Total	41.4	38.4	42.0)	52.3	47.2	53.1	15.4	7.5	16.8	21.8	13.1	23.3

			Promotion and Time Period											
			E-4 by 30 Months			E-4 by 45 Months			E-5 by 45 Months			E-5 by 60 Months		
Rating	Education	Mental Category	All Grads	ASBs	NON-ASBs	All Grads	ASBs	NON-ASBs	All Grads	ASBs	NON-ASBs	All Grads	ASBs	NON-ASBs
GSM	HSDG	I / II	69.6	50.0	70.8	75.5	62.0	76.3	42.8	24.0	44.0	48.7	36.0	49.6
		IIIA	60.6	51.9	61.6	64.2	66.7	63.9	39.4	25.9	41.1	46.3	23.1	50.7
		IIIB	64.6	53.8	66.7	75.6	69.2	76.8	40.2	23.1	43.5	46.3	23.1	50.7
		IV / V	59.3	33.3	62.5	63.0	33.3	66.7	25.9	0.0	29.2	29.6	0.0	33.3
		Subtotal	67.1	50.5	68.5	72.8	63.4	73.7	41.6	23.7	43.1	47.6	31.2	49.0
	NONHSDG	I / II	25.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0	25.0
		IIIA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		IIIB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Subtotal	16.7	0.0	16.7	16.7	0.0	16.7	16.7	0.0	16.7	16.7	0.0	16.7
		Total	67.1	50.5	68.2	72.8	63.4	73.3	41.6	23.7	42.9	47.6	31.2	48.9
HT	HSDG	I / II	36.7	66.7	35.6	42.2	66.7	42.1	40.8	0.0	40.8	51.9	0.0	52.0
		IIIA	60.8	28.6	61.0	67.7	28.6	67.9	27.3	0.0	27.5	30.9	0.0	31.1
		IIIB	58.6	10.0	59.0	66.6	30.0	66.0	24.0	10.0	24.2	27.3	10.0	27.4
		IV / V	57.8	66.7	57.6	68.0	66.7	68.0	27.7	66.7	27.1	25.1	66.7	31.5
		Subtotal	51.2	30.4	51.3	58.1	39.1	58.2	31.1	13.0	31.2	37.3	13.0	37.5
	NONHSDG	I / II	36.2	33.3	36.2	45.4	66.7	44.9	13.1	0.0	13.4	19.2	0.0	19.7
		IIIA	31.3	14.3	32.1	44.4	14.3	46.0	13.9	0.0	14.6	18.1	0.0	19.0
		IIIB	28.6	0.0	30.0	41.7	75.0	40.0	19.0	0.0	20.0	23.8	0.0	25.0
		Subtotal	32.4	14.3	33.1	44.1	42.9	44.2	14.8	0.0	15.4	19.8	0.0	20.6
		Total	49.6	24.3	49.8	56.9	40.5	57.1	29.7	8.1	29.9	35.8	8.1	36.1

			Promotion and Time Period											
			E-4 by 30 Months			E-4 by 45 Months			E-5 by 45 Months			E-5 by 60 Months		
Rating	Education	Mental Category	All Grads	ASBs	NON-ASBs	All Grads	ASBs	NON-ASBs	All Grads	ASBs	NON-ASBs	All Grads	ASBs	NON-ASBs
MS	HSDG	I / II	47.3	20.0	47.4	57.8	20.0	58.0	16.9	0.0	17.0	23.1	0.0	23.3
		IIIA	46.6	45.5	46.7	54.1	45.5	54.2	11.5	0.0	11.7	17.9	0.0	18.1
		IIIB	41.5	25.3	42.0	51.5	38.7	51.9	6.5	1.3	6.6	14.4	8.0	14.6
		IV / V	37.3	11.1	38.6	49.6	19.4	51.1	3.6	0.0	3.7	11.5	0.0	12.0
		Subtotal	42.9	22.8	43.4	52.8	33.1	53.3	8.8	0.8	9.0	16.1	4.7	16.4
	NONHSDG	I / II	25.3	0.0	25.3	31.2	0.0	31.2	7.6	0.0	7.6	10.0	0.0	10.0
		IIIA	17.3	25.0	17.2	21.3	25.0	21.3	3.1	0.0	3.2	4.4	0.0	4.5
		IIIB	23.1	0.0	23.9	33.1	37.5	32.9)	2.5	0.0	2.6	5.0	0.0	5.1
		Subtotal	21.7	8.7	21.9	28.4	33.3	28.3	4.1	0.0	4.2	6.1	0.0	6.2
		Total	40.6	21.6	41.0	50.1	33.1	50.5	8.3	0.7	8.5	15.0	4.3	15.3
RM	HSDG	I / II	66.7	37.0	68.1	73.3	44.4	74.7	34.9	9.3	36.2	41.1	14.8	42.4
		IIIA	57.7	45.6	59.3	67.1	55.3	68.7	18.2	9.6	19.4	24.6	15.8	25.8
		IIIB	53.8	35.1	56.4	63.9	46.9	66.3	12.5	4.2	13.7	19.9	8.5	21.5
		IV / V	48.5	39.8	49.7	58.9	54.1	59.5	9.1	1.0	10.2	16.5	12.2	17.1
		Subtotal	56.9	38.8	59.0	65.8	50.1	67.6	18.7	5.5	20.2	25.5	11.7	27.2
	NONHSDG	I / II	31.8	7.1	35.4	40.9	14.3	44.8	14.5	7.1	15.6	15.5	7.1	16.7
		IIIA	30.2	23.8	31.8	39.6	23.8	43.5	7.5	9.5	7.1	10.4	9.5	18.8
		IIIB	30.8	24.3	33.3	44.6	43.2	45.2	6.2	2.7	7.5	14.6	8.1	17.2
		Subtotal	32.4	20.8	33.6	44.1	31.9	44.5	14.8	5.6	10.2	13.6	8.3	15.0
		Total	55.0	36.4	57.4	64.1	47.7	66.2	18.0	5.5	19.6	24.7	11.3	26.4

			Promotion and Time Period											
			E-4 by 30 Months			E-4 by 45 Months			E-5 by 45 Months			E-5 by 60 Months		
Rating	Education	Mental Category	All Grade	ASBe	NON-ASBe	All Grade	ASBe	NON-ASBe	All Grade	ASBe	NON-ASBe	All Grade	ASBe	NON-ASBe
YN	HSDG	I / II	58.3	0.0	58.5	67.0	50.0	67.0	31.1	0.0	31.2	35.5	0.0	35.6
		IIIA	44.7	57.1	44.6	59.0	71.4	58.9	15.1	14.3	15.1	22.0	14.3	22.0
		IIIB	42.2	33.3	42.3	57.4	75.0	57.1	11.3	16.7	11.2	19.2	16.7	19.2
		IV / V	45.0	0.0	45.2	56.4	0.0	56.6	10.3	0.0	10.3	16.0	0.0	16.0
		Subtotal	48.8	33.3	49.0	61.1	66.7	61.1	19.2	12.5	19.3	25.4	16.7	25.5
	NONHSDG	I / II	21.6	0.0	21.6	29.9	0.0	29.9	7.2	0.0	7.2	13.4	0.0	13.4
		IIIA	10.6	0.0	10.8	25.8	0.0	26.2	3.0	0.0	4.6	6.1	0.0	6.2
		IIIB	10.5	0.0	11.1	15.8	50.0	13.9	5.3	0.0	5.6	15.8	50.0	13.9
		Subtotal	15.9	0.0	16.2	25.9	33.3	25.8	6.0	0.0	6.1	11.4	33.3	11.1
		Total	46.7	29.6	46.9	58.8	63.0	58.8	18.4	11.1	18.4	24.5	18.5	24.5

APPENDIX E
Cost and Setback Data by Individual Rating

Rating - AE	Fiscal Year					Average Annual Increase (Decrease) (%)
	1986	1987	1988	1989	1990	
Fixed Cost per Graduate ($)	3835	3339	2213	3002	4151	2.1
Variable Cost per Graduate ($)	9525	9265	9796	12085	12974	9.1
Number of Graduates	4265	3065	2883	1389	1496	(16.2)
Number of Attrites	427	442	380	369	222	(12.0)
Graduate to Attrite Ratio	10.0:1	6.9:1	7.6:1	3.8:1	6.7:1	(8.3)
Setback Rate (%)	21.0	22.0	23.0	47.0	42.0	5.2
CDPs	6218 6235 6515	6218 6515	6218 6515	6515	6515	

Rating - BT	Fiscal Year					Average Annual Increase (Decrease) (%)
	1986	1987	1988	1989	1990	
Fixed Cost per Graduate ($)	2900	3340	2757	2652	3138	2.1
Variable Cost per Graduate ($)	5569	7553	8952	8937	9973	19.8
Number of Graduates	3173	2346	1988	1542	1029	(16.9)
Number of Attrites	431	223	326	342	152	(16.2)
Graduate to Attrite Ratio	7.4:1	10.5:1	6.1:1	4.5:1	6.8:1	(2.0)
Setback Rate (%)	90.0	50.0	43.5	33.5	17.5	18.1
CDPs	6260 6486	6260 6486	6260 6486	6260 6486	6260 6486	

Rating - GSM	Fiscal Year					Average Annual Increase (Decrease) (%)
	1986	1987	1988	1989	1990	
Fixed Cost per Graduate ($)	941	6173	4355	4284	6011	(0.8)[1]
Variable Cost per Graduate ($)	1826	14121	15879	16496	16295	(5.1)[1]
Number of Graduates	259	317	555	509	649	34.9
Number of Attrites	5	56	111	127	58	2.3
Graduate to Attrite Ratio	51.8:1	5.7:1	5.0:1	4.0:1	11.2:1	32.2
Setback Rate (%)	37.0	NA	32.0	32.5	22.0	(5.0)[2]
CDPs	606B	614W 614T	614W 614T	614W 614T	614W 614T 6720	

Rating - HT	Fiscal Year					Average Annual Increase (Decrease) (%)
	1986	1987	1988	1989	1990	
Fixed Cost per Graduate ($)	3008	1741	2082	1743	1872	(9.4)
Variable Cost per Graduate ($)	6741	5679	5899	5878	5714	(3.8)
Number of Graduates	929	1203	912	843	1005	2.0
Number of Attrites	64	67	58	28	79	5.9
Graduate to Attrite Ratio	14.5:1	18.0:1	15.7:1	30.1:1	12.7:1	(3.1)
Setback Rate (%)	1.0	0.0	0.0	0.0	0.0	(0.3)
CDPs	6119	6120[3]	6120	6120	6120	

Rating - MS	Fiscal Year					Average Annual Increase (Decrease) (%)
	1986	1987	1988	1989	1990	
Fixed Cost per Graduate ($)	1074	954	972	958	1346	6.3
Variable Cost per Graduate ($)	2226	2807	2760	3098	4334	23.7
Number of Graduates	1699	2366	3231	3382	2537	12.3
Number of Attrites	160	278	314	209	343	28.6
Graduate to Attrite Ratio	10.6:1	8.5:1	10.3:1	16.2:1	7.4:1	(7.6)
Setback Rate (%)	7.0	22.0	23.0	18.0	10.0	0.3
CDPs	6125	6125	6125	6125	6125	

Rating - RM	Fiscal Year					Average Annual Increase (Decrease) (%)
	1986	1987	1988	1989	1990	
Fixed Cost per Graduate ($)	2524	2403	2601	2722	2426	(0.1)
Variable Cost per Graduate ($)	5347	7042	7478	7259	7318	9.2
Number of Graduates	2677	2109	1978	2105	2378	(2.8)
Number of Attrites	546	632	647	470	317	(10.5)
Graduate to Attrite Ratio	4.9:1	3.3:1	3.1:1	4.5:1	7.5:1	13.3
Setback Rate (%)	33.0	39.0	42.0	20.0	27.0	(1.5)
CDPs	611E	611E	611E	611E	611E	

Rating - YN	Fiscal Year					Average Annual Increase (Decrease) (%)
	1986	1987	1988	1989	1990	
Fixed Cost per Graduate ($)	1684	1752	1843	1521	1772	1.3
Variable Cost per Graduate ($)	3306	6014	5773	4059	4388	8.2
Number of Graduates	1142	1489	1432	1148	1193	1.1
Number of Attrites	139	213	280	132	86	(9.5)
Graduate to Attrite Ratio	8.2:1	7.0:1	5.1:1	8.7:1	13.9:1	17.4
Setback Rate (%)	1.0	0.0	6.0	27.0	16.0	3.7
CDPs	6057	6057	6057	6057	6057	

LIST OF REFERENCES

1. Naval Education and Training Command, "Advancement Handbook for Petty Officers," NETPMSA, Pensacola, Florida, 1 January 1991.

2. Chief of Naval Technical Training, CNTECHTRA Instruction 1540.39C, "Attrition and Setback Policy, Monitoring, and Reporting Procedures," 13 April 1984.

3. Chief of Naval Education and Training, CNET Instruction 1500.16B, "Review of NAVEDTRACOM Course Utilization and Student Management for Specialized Skill Training," 3 July 1990.

4. Crawford, Alice M. and Firehammer, Robert L., "Attrition Reporting in Technical Training," NPS 54-90-022, Department of Administrative Sciences, Naval Postgraduate School, Monterey, California, 1990.

5. Eitelberg, Mark J., *Manpower for Military Occupations*, Human Resources Research Organization, Alexandria, Virginia, 1988.

6. Sheills, Martha E., *A-School and Navy Attrition*, Center for Naval Analyses, CNA Research Memorandum 90-59, Alexandria, Virginia, 1990.

7. Bretz, Jr., Robert D., "College Grade Point Average as a Predictor of Adult Success: A Meta-Analytic Review and Some Additional Evidence," *Public Personnel Management*, Vol. 18, No. 1, Spring 1989.

8. Nelson, Alice M., "Undergraduate Academic Achievement in College as an Indication of Occupational Success," United States Civil Service Commission, Washington, D.C., 1975.

9. Orlansky, Jesse, "The Cost-Effectiveness of Military Training," Institute for Defense Analyses, Alexandria, Virginia, 1985.

10. Naval Education and Training Program Management Support Activity, Letter from Director, Analysis and Costing Division, 28 March 1991.

11. Lombardo, Cynthia, "Do the Benefits of Training Justify the Costs?" *Training and Development Journal*, December 1989.

12. Knapp, Mark I. and Orlansky, Jesse, "A Cost Element Structure for Defense Training," Institute for Defense Analyses, Alexandria, Virginia, 1983.

13. Nakada, Michael K., Milczersky, Wolfgang, and Wax, Stephen R., "Enlisted Training Tracking file (TRAINTRACK)," NPRDC TR88, San Diego, California, April 1988.

14. Anderson, T. W. and Sclove, Stanley L., *The Statistical Analysis of Data*, 2nd ed., The Scientific Press, Palo Alto, California, 1986.

15. SAS Institute Inc., *SAS Users Guide: Basics*, 5th ed., Cary, North Carolina, 1985.

16. Reinhart, Bruce and Blomgren, Glen H., *Cost Benefit Analysis–Trade and Technical Education*, California State Department of Education, Sacramento, California, 1969.

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